

## THE WHITECLIFF IRONWORKS

### IN THE FOREST OF DEAN

by IAN STANDING

"The operation of extracting crude or cast iron from the ores, is one of the least complicated processes in the art of fusion. Simply, the materials are thrown into the furnace, stratum super stratum, and crude iron is the result ..."\*

Accounts of the history of the Whitecliff ironworks by the present author were published during 1980 (1) and 1981 (2). They described the building of a coke-fuelled blast furnace for smelting iron-ore before 1800 and traced the early partnerships. By 1808, Thomas Halford, a stockbroker of London, was a major partner. He found the works unprofitable and consulted the well-known expert, David Mushet, who at that time was a partner in the Alfreton Ironworks of Derbyshire.\*

During the period 1808-1810 a major rebuilding of the ironworks was designed and supervised by Mushet. It was financed largely by Halford. The two men became close friends during this period and by early 1810 Mushet became a partner with a quarter share of the ironworks and its associated mineral enterprises. The history so far published traces events to 5 February 1810 when Mushet was about to leave Alfreton and take up residence at Coleford to manage the Whitecliff Ironworks.

Mrs Agnes Mushet and the children were to follow as soon as a suitable house could be found. A letter dated 4 June 1810 (3) written by Mrs Mushet to her daughter Margaret contains family news, and suggests that their arrival in Coleford was recent; it also mentions a sixth child, James, who was unnoticed by earlier biographers.(4)

By February 1810 the rebuilding was almost complete. The works were blown in and a series of iron-making trials began. As early as 1808 Mushet had written to Halford (5):

"You know that after an experiment of six years the work has completely failed and in many respects the ground must be gone over again ... But it is still possible that I may be deceived; tho' at the same time I assure you that unless I saw a prospect ... I should have nothing at all to do with the thing."

There was no doubt that iron could be made but it had to be profitable. This entailed the making of a consistent quality grey iron and producing about 40 tons a week by each furnace: outputs which Mushet had achieved at Alfreton shortly before he moved.

Until recently very little was known about the subsequent events. The first published account was in 1858 (6) and this has been the principal source of information for earlier researchers. The author was a Mr Bishop, a manager of the later Cinderford Ironworks. He contributed a lengthy text concerning coke iron smelting in Dean and recorded:

\* David Mushet, Papers on Iron & Steel, 1840; probably written before 1800.

"... It was during this interval that the name of David Mushet appears in connexion with the Forest. He made his first essay (sic) at White Cliff near Coleford in partnership with a Mr Alford (sic). The result was the loss of the entire investment, and a dismantling of the works except the shell of the buildings, as a monument over the grave of departed thousands ... The names of Birt and Teague then appeared, but all failed."

In his account, Bishop talks of failure, and has also inverted the chronology of Teague and Birt. They were partners at Whitecliff before Mushet's introduction.

In 1866 Nicholls published a monograph on iron-making in Dean. He used the same text as Bishop, but the lines dealing with Whitecliff and the "departed thousands" were omitted. Perhaps the surviving members of the Mushet family complained about them?

In 1877, nearly seventy years after the failure. David Mushet's eldest daughter Margaret published her book about Coleford.(7) She included a few words on her father's association with Whitecliff

"... The Whitecliff Iron works were not carried on for long. After a time Mr Mushet had grave reasons for being most dissatisfied with his partners, who had been introduced to him by one of the leading men in London, and he withdrew. Whitecliff has been silent ever since ..."

In common with Bishop, this account has also influenced researchers and is not totally correct. Some new and independent information is contained in a draft letter from David Mushet (8), probably written in 1827. At an A.G.M. of the British Iron Company in 1826, Mushet had been nominated or appointed a director of that company. His suitability for the post had been challenged by a Mr Edward Taylor, who had circulated a letter containing seven pithy questions. Those concerning Whitecliff were:

"First. Was not Mr. D. Mushet the Agent to Messrs Halford, Stockbroker and some other parties who were persuaded by him to venture a very large sum on an Iron-work in the Forest of Dean: did they not fail under his management and are not the works now a ruin?

Second. Did not Mr. Robert Mushet make an offer of these works to the British Iron Company as a very eligible investment for their money?

Third. By what means did they come into Mr. D. Mushet's possession?"

In his draft letter Mushet replied:

"... To the first question I reply that in 1809 Mr Thomas Halford came to me with an introduction from the late Mr. Ricardo to consult me about making Iron to profit at an Iron-work which he with other persons possessed near Coleford in the Forest of Dean. This led to a connection between Mr. Halford, another gentleman and myself as Copartners in a trial of Iron-making at these works, and which continued for six months; but being unprofitable I refused to continue longer. Mr Halford having an opinion different from mine as to the ultimate results sometime after purchased my share, and again carried on the work on his own account. Having found the works in Mr. Halford's possession, and having so left him in possession I submit to you whether I am accountable for their present state?

Second. Mr Robert Mushet (9) did not make an offer of these works to the British Iron Company, nor could he as my interest ceased eleven years before the B.I.C. was in existence.

Third. This question is answered by my reply to the First Question."

It should be noted that Mushet is not quite accurate in his reply to the first question. It was not Ricardo who introduced him to Halford in 1809 but William Lowry of Sheffield, who did so in 1808. Nevertheless, important facts emerge. Trials of ironmaking at Whitecliff were unprofitable and Halford continued with the works after Mushet's withdrawal. Evidence is produced elsewhere in this paper which demonstrates a close and trusting relationship between Halford and Mushet during 1812 and 1813. Thus the notion that the partners had fallen out with one another is no longer tenable.

#### Why did Mushet not succeed?

From the foregoing statements it is clear that the trials were unsuccessful and that Mushet had left the concern by late 1810 or early 1811. The lack of success must have arisen either from economic problems or from technical difficulties which prevented profitable production.

There is no evidence which suggests any lack of funds affecting matters. Mostly the venture was funded by Halford who appears to have repurchased Mushet's share after the trials. External economic matters such as the selling price of iron may have influenced projected profitability. It seems likely, although actual figures have proved impossible to obtain, that prices for cast iron began to fall somewhen after 1810 and worsened with the end of the Napoleonic war.

Technical difficulties seem a more likely explanation for a failure to become profitable. In 1808, Halford suggested that low output accounted for a lack of profits, but this is a simplistic view. Output would be important with regard to productivity, and a return upon labour costs and the capital investment. However, large tonnage alone would not ensure profitability. More important would be the cost per ton of making iron. In this, the raw materials would be very important and it is in this respect that the likely reasons for failure lay. If raw materials were expensive in price or quantity used, or if they were inefficient in the smelting process, profit levels would be adversely influenced.

The ironworks at Whitecliff differed from those at Alfretton and elsewhere in the country in respect of the raw materials used. With regard to ore, most coke-fired furnaces were smelting carbonate ores derived from the Coal Measures or other sedimentary rocks. Such ores were low in lime content and being low-grade ores tended to be accompanied by plenty of silica and other minerals useful within the blast furnace. In contrast, the Dean ore used at Whitecliff was a high grade limonite found within the Carboniferous Limestone and was rich in lime. It is very likely that apart from the nearby ironworks at Cinderford (which had failed) and at Parkend where success was not great, these ores were untried by the coke-iron industry.

In D Mushet's Papers on Iron & Steel there is no mention of the Whitecliff trials or the furnace. These papers consist of Mushet's lifelong researches and were published steadily in the Philosophical Magazine and elsewhere. In 1840 the entire collection was published in book form amounting to over 900 pages. From the book it is not possible to date individual papers, but Mushet comments on Dean ores as follows: (10)

In experiments to investigate the effects of rich ores in a blast furnace, he found that as more and more rich ore was added, both the quality and the quantity of iron produced deteriorated and black slags were formed. In other papers he showed that black slags and poor performance could also arise by a variety of factors including over-burdening, sudden falls in temperature and too narrow a furnace throat.

In a further paper (11) Mushet records "... It has of late years been established that the bar iron made from the iron-ores of the Forest of Dean is more red-short than any other iron produced in England, those ores so predominating in calcareous matter as to require not a limestone flux in the blast furnace, which is the case all England and Scotland over, but one as purely argillaceous and fusible as possible ..." Red-short refers to iron becoming brittle (instead of malleable) between bright red and scarlet-coloured heat.

Mushet's failure at Whitecliff may have been partly due to the difficult nature of the ore. It is probable however that he knew all about this before the trials. In 1808 Halford had written (12) about slag variations being probably caused by too much rich ore, and how they added leaner ores and bloomery slag as fluxes to improve matters.

The chief reasons for failure probably lay with the coke. A good metallurgical coke needed an open porous structure and a high crushing strength. The latter property was important both inside the blast furnace and in the making of the coke. Cokes which would not hold together consumed more raw material in the form of coal due to losses through dust and fines, and this increased costs.(13)

The cokes used at Whitecliff were probably made by charking coal in heaps in the open, somewhere adjacent to the charging platform. Ovens were not used. Whitecliff's coal supplies for coke came from the Coleford High Delph seam, although some Trenchard coal may also have been available. High Delph coal is a high volatile bituminous steam coal. Mushet's analysis of its coking properties (14) revealed a variation in yield of between 62% and 67% of the coal as coke. The best cokes were produced from coal near the top of the seam whilst the middle portion produced a light feathery coke which did not adhere together. Mushet noted that the coal had plates and surfaces of pyrites. In 1808 Halford recorded (15) that they considered the top part of the seam too "sulphurous" and therefore left it timbered up. Analysis of a piece of cast iron found at Whitecliff in 1978 disclosed a hard crystalline white iron with a sulphur content of 0.766.(16) Coke dust from a large deposit beneath an adjoining garden awaits analysis.

It is suggested that the combination of a difficult ore and an expensive and unsuitable coke, which also imparted a good deal of sulphur to the finished product, was the likely cause of failure. Whatever the exact cause, it led Bishop to recall:(17)

"... Mr Mushet's famous declaration that physical difficulties would forever prevent its success, and in connexion with such repeated failures, seemed for several years to have sealed up the (iron-making) prospects of the Forest ..."

In 1825 Moses Teague produced a coke from the Dean Low Delph coal and enabled Dean coke iron-making to become profitable. Moses Teague's work was carried out at Darkhill, most probably using David Mushet's cupola furnace and is outside the scope of the present paper.

### Whitecliff after Mushet.

Mushet must have withdrawn from the ironworks by late 1810 or early 1811. Mushet recorded (supra) that his share was repurchased by Halford who continued the works. On 12 September 1811 (18) James Revill of Old Gravel Lane supplied Halford with details of a "Frit Arch Furnace". The drawing shows this to be a small reverberatory furnace in which hot gases from an enclosed firebox pass over an area in which a charge is placed. The key to the drawing refers to the charge as "the composition" and makes no allusion to metallurgy. However, the structure appears to resemble, or to be capable of acting as, a puddling furnace. An alternative use may have been for roasting materials for cement or pigment manufacture. Revill's letter is the last of the Halford-Mushet letters in the Pye-Smith Collection. Thereafter, information is scant. \*\*

In 1812 the Monmouth Railway (a horse-drawn tramroad) was built and passed directly above the ironworks. Halford & Co were compensated for the land taken. (19) Although no proposed branches to the works were shown on the Parliamentary plan of 1809, both the 1st edition of the 25-inch OS map and the earthworks on site suggest that a branch, possibly connected at both ends, was constructed. Excavation will be required to decide whether this served the ironworks or later lime burning. Mr Harry Paar has examined the account books of the Monmouth Rly Co seeking records of iron or coal traffic to the works but without success. The scale and extent of iron-making at Whitecliff by Halford after Mushet had withdrawn is not known, but it cannot have been continued beyond 1816.

However traumatic Mushet's departure from the ironworks may have been to Halford, the two remained closely associated and on good terms with each other. This is evident in four letters from Halford to Mushet found in the Vizard Collection at G.R.O. (20), although none of them refer to ironmaking. The first is dated 4 December 1810 when Mushet may still have been at Whitecliff. It refers to the Bixslade Colliery, to the progress of the level there, and the fact that coal had been reached.

The second letter is dated 12 July 1811 (21) by which time the iron-making failure must have occurred. The tone is unchanged and the contents relate chiefly to deeds from Teague and Birt in connection with the Bixslade Colliery. A red pigment is turning out well and Mushet is to send up to London as much as he likes and also two tons of the black; "perhaps the latter would be better if were a little more lamp-black put into it..."

In the third letter, dated 12 May 1812 (22), from Halford in London to Mushet in Coleford, there is a mention of cement and the need to obtain testimonials for it. There has been good progress at the Gentlemen Colliers' Colliery, presumably coal opened up. Lastly there are suggestions of forming a new company for Bixslade and possibly selling it, but developing the Trenchard Coal ... I presume about £5,000 would open up the Trenchard and find capital to carry on the trade..."

### Disaster for Thomas Halford.

The fourth and last surviving letter from Halford to Mushet is dated a year later. (23) It is a harrowing letter from a man who only three years earlier had spent nearly £50,000 on his various Dean enterprises.

\*\* Information received from S D Coates suggests that "Frit" may have been concerned with enamelling. In any event there is no documentary evidence that the Frit arch furnace was at Whitecliff.

Thomas Halford  
to David Mushet, Coleford.

London 25 June 1813.

Dear Mushet,

I find by a letter I rec<sup>d</sup> from Mrs Mushet last night that Hewlett's bill is returned. This is wholly a mistake of the Bankers who held the bill, they promised to keep it a few days and I certainly did expect they w<sup>d</sup> have given me notice before they returned it. I w<sup>d</sup> have borrowed the money in twenty places sooner than it should have gone back to him again. I see by Mrs Mushet's letter it has quite upset her; she is all alarm & fear of a Bankruptcy of which I do not see any chance.

I trust she will be supported and endeavour to keep up her spirits though I am fully aware she has enough to try them. We shall get through I have no doubt although at present we are so distressed for money. I will take the responsibility upon myself to endeavour to borrow some money upon one of the coal gales to relieve us. I have been offered some upon coal property & I think I shall take it if your opinion of the coal property is still the same. I think I have spirits to get through otherwise I shall not, but throw it up. It is no use heaving a great burden if an end cannot be seen to it.

After a most severe opposition the South Wales Railway Bill has been carried in the Lords - surely this must put Forest property in a more favourable point of view. I shall remit now (?) by Turnsobers (?) Post the amount of Hewlett's bill then an (?) now unpaid. If you knew how much I have suffered lately for want of money you would pity me. I told Hewson how much we were distressed to carry on the Bixslade but he made no reply.

Mr J Fenn comes to London on Monday week with an intention of visiting Coleford. Hewson still talks of the great price, I told him you were not disposed to sell for less.

Believe me,  
your ...

Tho Halford.

Following this letter, the last from Halford to have survived, is one from Hewson (24) dated 28 June 1813. It concerns the proposed visit by Mr Fenn and suggests a meeting at Lydney to inspect the basin and harbour then under construction, and then walking up the line to Bixslade to view the coal works. Following the visit Hewson wrote to Mushet on 10 July 1813.(25) The tone is subdued and the letter seeks detailed information on output and sales of coal from Bixslade. Both Mr Fenn and Hewson are considering investment: "We are neither of us men who look for a large interest and if we could see the prospect of 5% for the money advanced we should be perfectly satisfied ..."

The final surviving letter in the series is again from Hewson, dated 31 August 1813.(26) Matters are still unresolved:

"I have this day sent Mr Fenn a copy of your letter that he may decide whether he thinks it best to advance the money you will want for the payment of the men, and his decision will guide me unless I should be fortunate in disposing of any of the color you now have in Town ..."

This letter also provides us with a last glimpse of Halford:

"... I assure you that I am almost worn down by the constant fatigue of mind I have had of late in attending to this unfortunate affair and after all to be so completely disappointed in every plan is enough to induce me to give it up in disgust. Yet I should be happy to serve you and Halford if any arrangements could be devised to make anything like a permanent benefit. And would Halford exert himself, I would be willing to hope that this might even now be effected. But certainly it cannot be expected that so many difficulties can be overcome without close and unremitting assiduity and punctuality, neither of which necessary qualifications Halford has.

I thank you for the reason you assign in valuing the Bixslade at so high a price, there is much weight of reasoning in what you advance 'tho I think even for a proprietor to work it is rather over valued ..."

The year 1813 appears to have been the turning point after which increasing financial difficulties beset both the central figures in the Whitecliff Ironworks story. From the very limited sources available it would seem that Halford's hitherto inexhaustible coffers were empty. Perhaps his other business interests in the City had faltered and the Dean enterprises were incidentally caught up. On 5 March 1813 an indenture was drawn up between David Mushet's brother Robert Mushet for a loan of £500 made to Halford, David Mushet and Hewson. Security relied upon property at Coleford Lane End which was to be the subject of a lawsuit in 1860-63. The surviving documents of this suit (27) record Halford's ultimate fate in scant detail:

"... and Thomas Halford, bankrupt February 1816..."

The gathering financial problems of 1813 must have worsened steadily for two more years. The account books of the Monmouth Rly Co (28) record both Halford and Mushet as owing money for shares for the half-year 1814-1815. As late as 1819-1820 the account books record Halford & Co as a debtor for £57 4s 2d.

#### The fate of David Mushet.

An affidavit by John Walkinshaw in 1860 (29) states:

"I am 72 years of age. In the year 1810 I was engaged by the late David Mushet deceased as accountant and Engineer. The said David Mushet then resided at Coleford afordsaid and managed an Iron Furnace at Whitecliff near Coleford which was eventually abandoned.

The said David Mushet afterwards carried on certain Coal-mines called Bixslade and Howlers Slade Collieries ..."

Mushet survived the crisis, but with difficulties. Some part of the Bixslade Colliery must either have been sold off or forfeited during Halford's bankruptcy because a lawsuit occurred in Chancery between John Peacock and other complainants, and David Mushet and other defendants. The surviving details are probably incomplete but a settlement dated 1823 between David Hewson and David Mushet formed part of the evidence. This settlement resulted from another suit, also in Chancery, between Mushet and Hewson. The agreed terms were that Mushet would pay Hewson £600 and Hewson would assign to him all claims to the Bixslade Colliery.(30) The claims by Peacock and others are not stated in the surviving documents.

Mushet, during the difficult years, presumably derived some income from the collieries as well as from his many other activities. In 1817, for example, Mushet was engaged in yet another lawsuit concerning a lease of mines of copper ore, lead, manganese and other minerals, in the parish of Talachddu, Breconshire.(31) By 1818 Mushet was active at Darkhill and benefitting financially from some of his patents. Hart, 1971,(32) records details of Mushet's subsequent activities.

#### The Whitecliff Ironworks after Halford and Mushet.

No evidence has been found which indicates any ironmaking at Whitecliff since Halford's time and the exact date at which he ceased operations is unknown, but it cannot be later than 1816 and was possibly as early as 1812. The manufacture of pigments continued at least until 1813, but how much of this work was done on the ironworks site is uncertain.

Bishop, in Nicholls 1858,(33) records that "A large quantity of the castings were brought to Cinderford in 1827, and were connected with the blast apparatus attached to those works..." The exact meaning is uncertain; Hart, 1971 (34) took it to mean that a "large quantity of castings including blast apparatus were taken to the Cinderford Blast Furnace in 1827..." In this Dr. Hart is probably correct; a strict interpretation would suggest only castings were moved and these would not be produce of the Whitecliff Ironworks but the constructional ironwork of the furnaces, such as cast iron lintels from the forepart wall, blast mains, and such like. The absence of the lintels from the extant furnace supports this. However, it is unlikely that a ventilating engine would be left on site when the Cinderford works were expanding.

The earliest map depicting the ironworks after the demise of Halford & Co is the Tithe Award Map of 1840 (35) - see Map 2. Upper Whitecliff Farm, No 914, the road and Furnace Cottage are well mapped but the details of the furnaces are missing. Some shading indicates an unusual (and, for us, lamentable) lack of accurate detail for the site at this early date. However, the shaded block depicted running from the bank towards the road SE of No 938 may be a building within the present-day paddock. Other boundaries and subdivisions are apparent within the site.

The year 1852 witnessed a proposed railway to Coleford for which an accurate survey was undertaken and the works, being close by, are depicted as incidental detail: see Map 3. The survey appears to have the hallmarks of reliable detail and accuracy, and it superimposes on later OS maps. The standing structures are almost as they appear today. One furnace is extant with a possible cast-house in front. Superimposition of this map upon the Tithe Map suggests that plot 105 probably equates with plot 938 of the Tithe Map. The 1st edition of the OS 25-inch map, 1880, shows various subdivisions of the site south of the extant furnace. Once again, a possible cast-house is evident but it might be an enclosure. The 2nd edition of 1902 (see Map 4) shows fewer sub-divisions within the main boundaries of the plot. Subsequently the area around the furnace appears to have changed very little up to 1970. The maps reproduced in this paper have been redrawn from the originals by Gordon Clissold at a constant scale of 1:1250 so that they become directly comparable. The Tithe Map of 1840 has a variation of scale and some unreliable planimetry within the original which has not been corrected in the redrawn version. Nevertheless, by overlaying, much valuable information is derived which will greatly aid the interpretation of the features now being discovered on site by archaeological excavation.



Since 1840, and probably from shortly after the demise of the ironworks, various buildings on site became residential accommodation. This includes Furnace Cottage and what today is known as the Engine House. The ownerships and tenantry are listed, so far as they are known, in the keys and notes opposite the maps.

The earliest surviving deed is a conveyance of 1907 for:

"... All those two cottages or dwellinghouses with the gardens and outbuildings thereto adjoining and belonging situate in Whitecliff ... as the same are now in the respective occupations of Aaron James junior and George Taylor as tenants thereof. Also all that piece of land with the buildings formerly used as furnaces standing thereon..."

The conveyance was from the beneficiaries of the will of John James Hough, late of Gloucester, to Francis Webb of Whitecliff, who had purchased the property at auction for £90. There is a reference to an earlier conveyance of 1899 which described the bounds of "All those two cottages, smithery, old furnaces, buildings, yard and land." One of the two cottages was tenanted by William Watkins.(36)

At that time the property included the land lying to the south of the present paddock. During the early part of the present century, probably around 1920, the land was divided. On the southerly portion a bungalow was built, chiefly from ironworks masonry. The style was Edwardian and the property was known as Anwylfa until about 1982 when the name was changed and it was enlarged. Until 1982 it was the home of Mrs M Cox, a well-known resident of Whitecliff. Furnace Cottage and the rest of the ironworks belonged to other members of the Cox family until 1970 or 1971.

During the first half of the present century the furnace and ironworks would have been regarded as something of interest, but at the same time as a derelict and dangerous ruin. In consequence, it became a source of stone for re-use and as late as the early 1960s masonry from the left-hand corner of the furnace was actively removed.

In the late 1940s research was underway by F M Osborn and T Alec Seed for the book The Story of the Mushets. This led to visits from both Alec Seed and John Osborn who were shown the various Mushet sites by the late Tom Bright of Coleford. The Dean Forest Guardian carried a leader on the Mushets on 19 August 1949 and this engendered a lively correspondence in the following issue with letters from C E Hart, Holman Hunt, W G McGowan and others. In 1951 the Forest of Dean Local History Society heard a lecture by T Alec Seed on "The Romance of the Mushets" and a tour of sites, including Whitecliff, preceded the meeting.(37) Thus, partly due to the centenary celebrations of the Sheffield company of Samuel Osborn which led to the Mushet book, and partly from a growing local interest, a new awareness of the site began to emerge.

By 1962 another book was being researched, this time by Harry Paar, and it concerned the tramroad and railways of Dean. In late April 1962 he wrote to the Iron & Steel Institute enclosing details and a photograph of Whitecliff Furnace, and enquired what might be done to effect preservation.(38) Mr M Pearl of the Institute was not hopeful for preservation, nor was Mr W K V Gale who also wrote in reply.(39)

By 1966 Cyril Hart was researching for his projected book The Industrial History of Dean, and was responsible for the first achievement towards positive preservation. In 1967 he organised a Dean

conference for a fairly new group of enthusiasts who had come together to form the Historical Metallurgy Group \*\*\* of the Iron & Steel Institute.

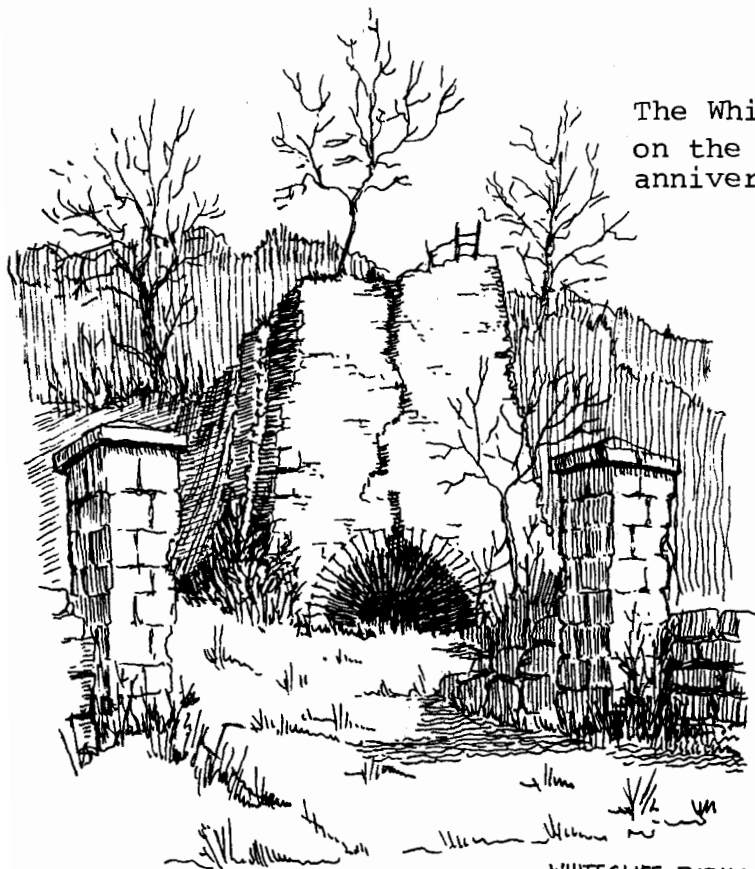
Whitecliff Furnace and many other sites were visited. Immediately after the conference, lobbying was undertaken for the preservation of both Whitecliff and Gunns Mill. On 29 August 1968 Whitecliff Furnace became the subject of a Building Preservation Order under the Town & Country Planning Acts.(40)

In the Autumn of 1970 Amina Chatwin, recently elected hon. secretary of the, then young, Gloucestershire Society for Industrial Archaeology, wrote to Cyril Hart enquiring for any news of progress towards preservation at Whitecliff and Gunns Mill. Cyril Hart's reply (41) read in part:

" As to the two furnaces, I was instrumental in getting them registered, but they are simply deteriorating. All I was empowered to do by the East Dean and West Dean RDSc was to obtain specifications and estimates for the necessary work which they would then consider..."

Although neither of the two knew it at that time, a further eleven years were to elapse before the first repairs to the furnace took place; but that is another story and as yet it is unfinished. It is shaping up well, and will be related on some future occasion.

I J Standing © 1986



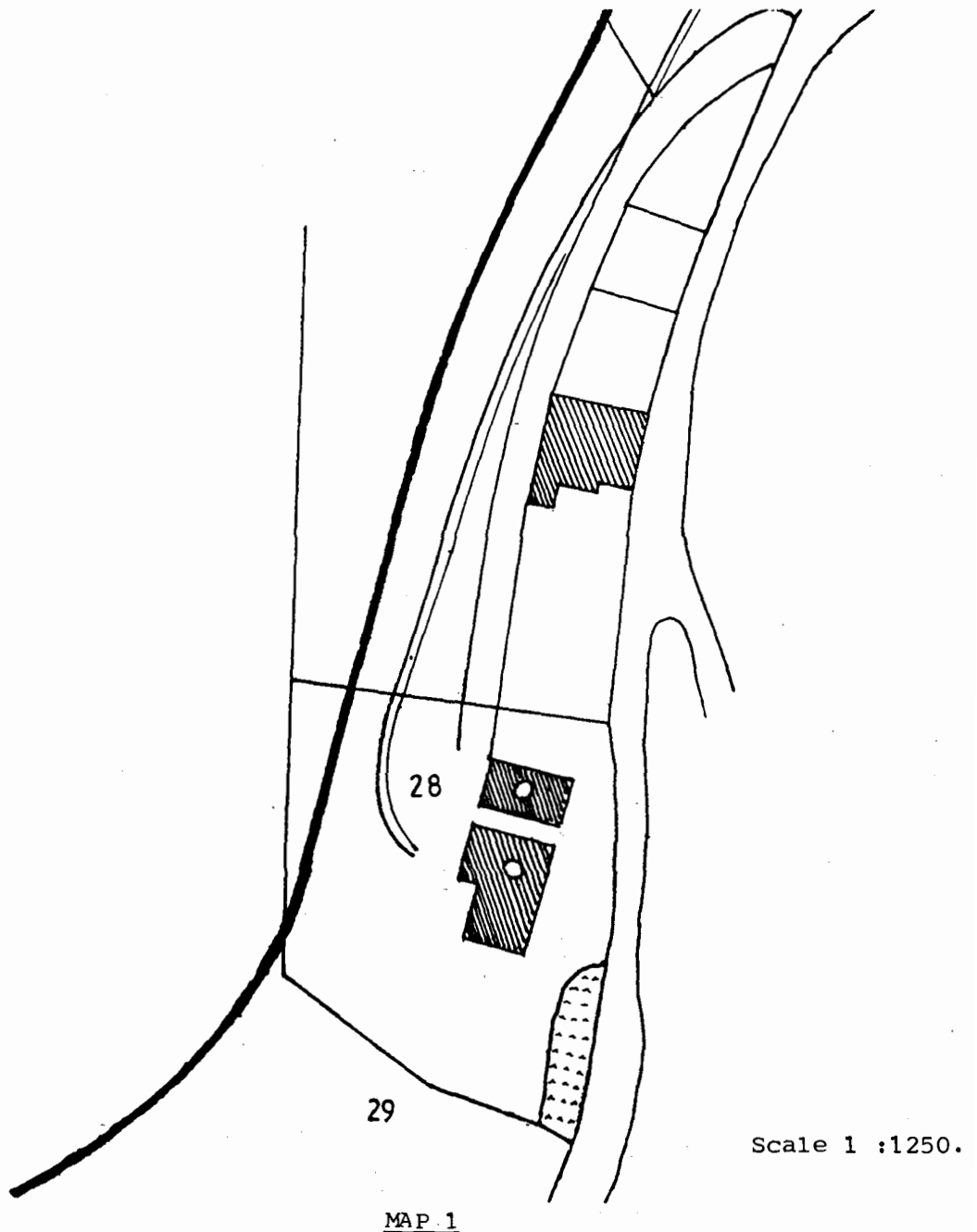
The Whitecliff Furnace as it appeared on the cover of the Journal's tenth anniversary issue, in 1974.

Drawn by - who else but? -  
Pat Lane, T.D.

PATRICK LANE

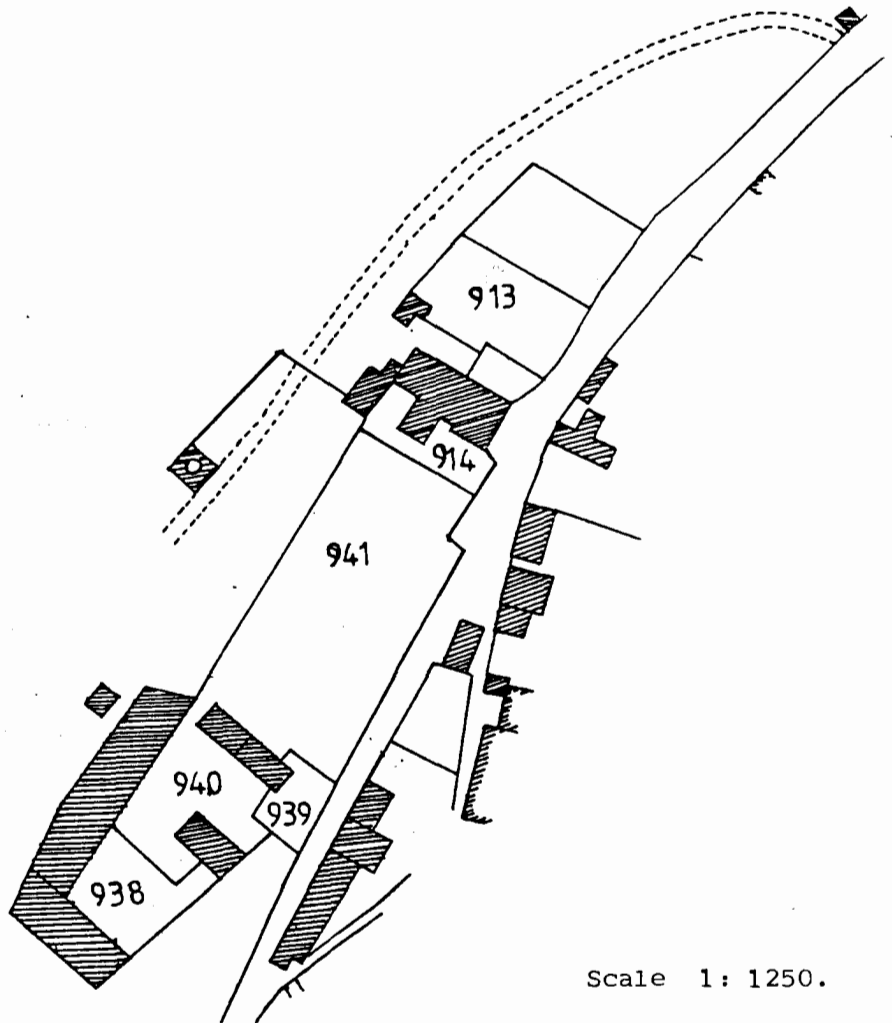
WHITECLIFF FURNACE

Grid Ref. SO 568103.



MAP 1 The Whitecliff Ironworks in 1809.(42)

The purpose of the survey was to indicate the intended course of the proposed Monmouth Railway. This was a tramroad and is represented by the thick black line on the western side of the works. Two furnaces are depicted and the word Furnaces appears on the original. Most of the detail within the plots is incidental to the main purpose of the plan and has probably been sketched rather than measured. Halford & Co owned plot 28, and Jane Quick owned Plot 29.



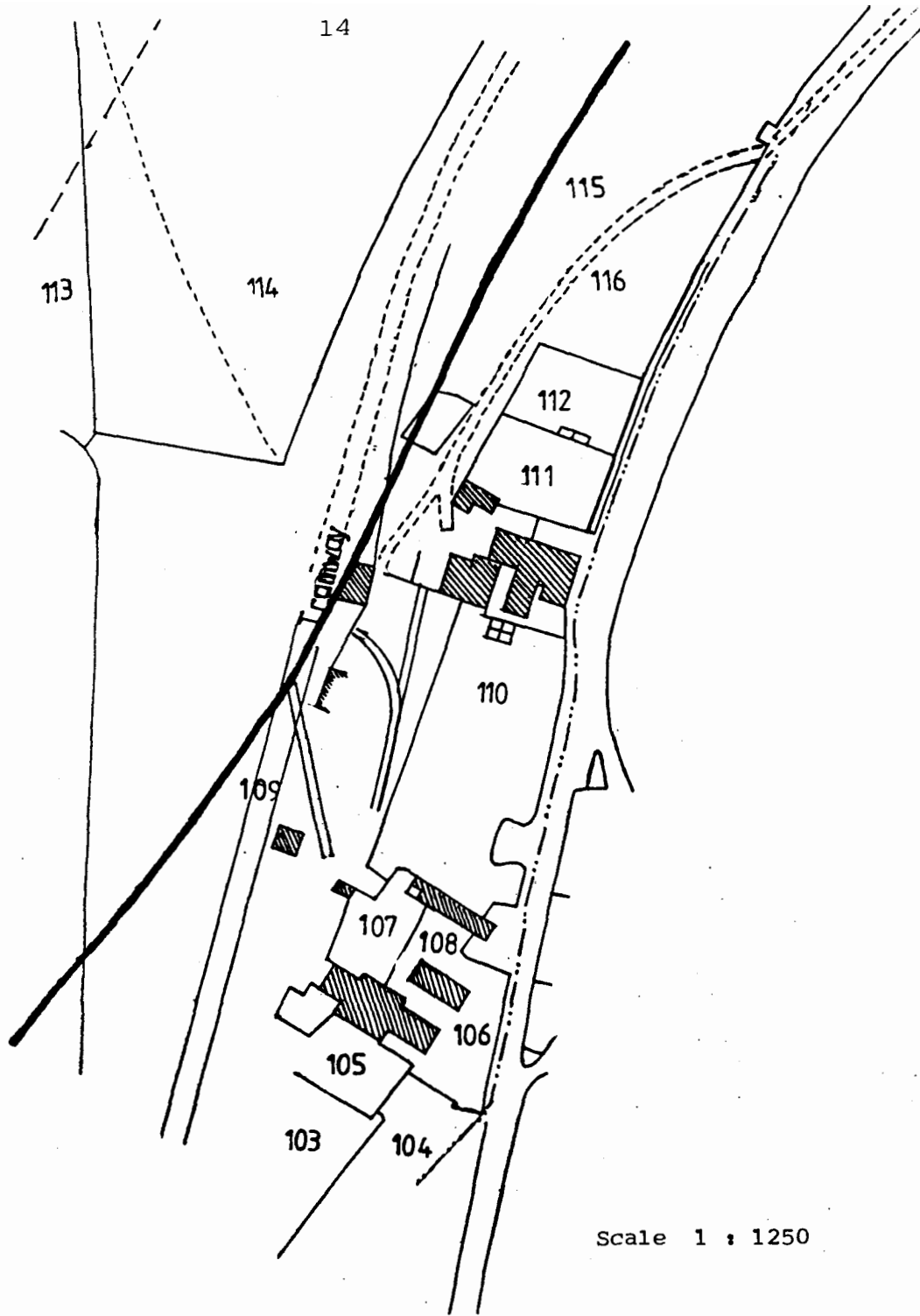
Scale 1: 1250.

MAP 2MAP 2 Whitecliff Ironworks site as shown on the Tithe Map 1840.

No furnaces are shown but Furnace Cottage and the 'Engine House' as it is known today are identifiable. South of the site the pond had disappeared, but its shape remained as plot 936, described as 'garden'.

<u>Owners</u>	<u>Occupier</u>	<u>Description</u>
913 Rev John Shipton	John Rosser	-
914 "	John Rosser	Whitecliff Farm
940 Thomas Merrick	William Evans	Hse & Gdn
939 " "	Thomas Martin	" "
938 Thomas Merrick	in hand	Furnace Yard
941 Rev J Shipton	John Rosser	Meadow

To the south of the Ironworks lay plot 961 owned by W Hewlett, occupied by James Probert and called Furnace Meadow.

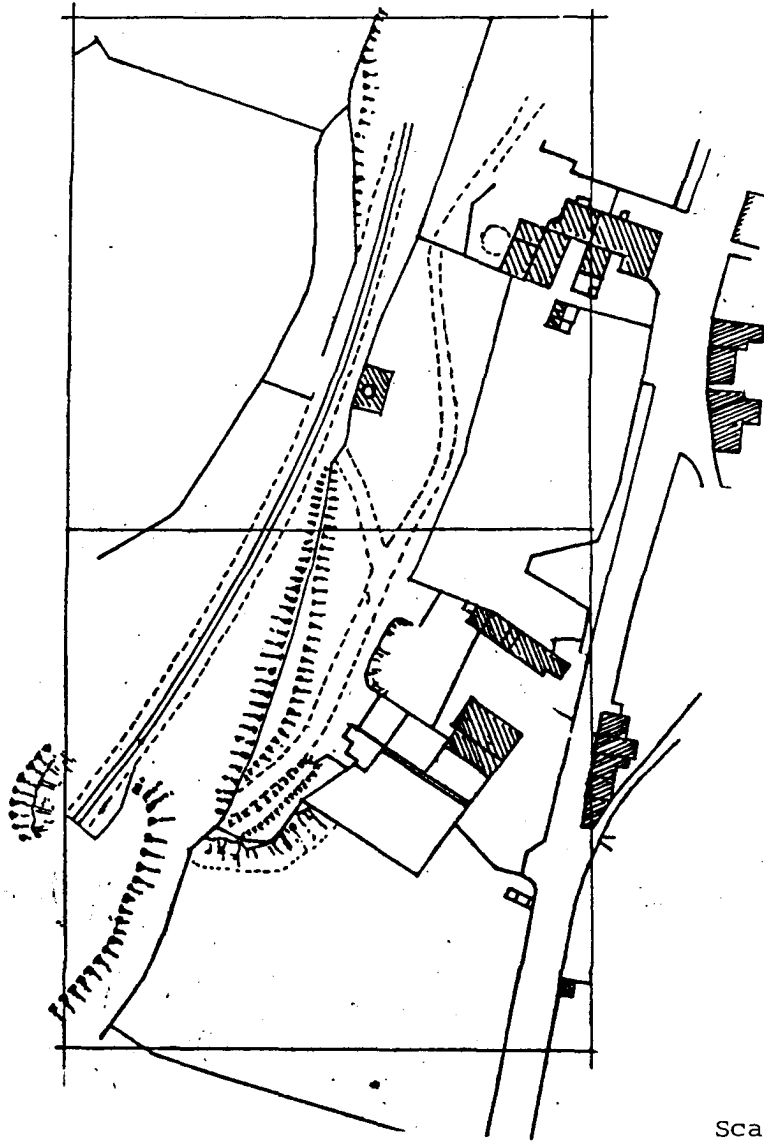


MAP 3

MAP 3 Whitecliff Ironworks site in 1852 (43).

This finely executed survey was carried out for a projected railway from Pontypool via Monmouth and the Forest to Blakeney. It was never built. The projected course is shown by the thick black line. Owners, occupiers and description of parcels are given over-leaf.

See p 20 for identification of owners etc. of numbered plots.



Scale 1 : 1250.

MAP 4

MAP 4 The site in 1902, based on 3rd edition OS 25" sheet, grid added.

(Note. The grid should be perpendicular in the vertical and horizontal across!)

ACKNOWLEDGEMENTS

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I.J.S.

Sources & Notes

- 1 Standing I J, 1980. The Whitecliff Ironworks in the Forest of Dean. Part One 1798-1808. (Journal of the Gloucestershire Society for Industrial Archaeology for 1980, pp 18-20, illus.)
- 2 Standing I J, 1981. Dear Mushet. A history of the Whitecliff Ironworks, Part Two. 1808-1810. Jnl GSIA for 1981 pp 32-71.
- 3 Letter from Agnes Mushet to Margaret Mushet, 4 June 1810. A typed copy is in Dr Hart's historical files. In 1954 the original was in the possession of Mr T Alec Seed of Samuel Osborn & Co., Sheffield.
- 4 James Mushet, died 23 July 1842 aged 35 years. A record of the gravestone at St Mary's Church, Cheltenham, is in Glos. Notes & Queries vol 3.
- 5 GRO D2646/48. Reprinted in (2) supra p 45.
- 6 Nicholls H G, 1858. The Forest of Dean pp 224-226.
- 7 Mushet, Margaret 1877. Something about Coleford and the Old Chapel.
- 8 GRO D2646/171.
- 9 Robert Mushet was a brother of David; not to be confused with the sone, Robert Forester Mushet.
- 10 Mushet D, 1840. Papers on Iron and Steel pp 275-6 and 425. These particular papers were probably written before 1800.
- 11 Ibid p 31 and 75, probably written before 1800.
- 12 GRO D2646/8 & 13.
- 13 Mushet D, Papers on Iron and Steel p 69.
- 14 Ibid p 876-7.
- 15 GRO D2646/13.
- 16 The specimen of cast iron was a small solidified splash of metal found on site c.1976. Analysis kindly communicated by Mr A Freer disclosed: Si 0.66; P 0.11; S 0.766; C 2.90. The metal was exceedingly hard.
- 17 See (6) supra p 225.
- 18 GRO D2646/117.
- 19 GRO D2437/1 & 2, also Q/RUM 34. Much of this material is reprinted by C E Hart, 1983, Coleford pp 243-248.
- 20 GRO D637 II 7 B1.
- 21 to 26 inclusive. Ibid.
- 27 GRO D192/4.
- 28 Information researched and communicated by Harry Paar.
- 29 The affidavit was among the deeds of the property. Mr Gerald Morris of Coleford has generously donated it to the Whitecliff Furnace Trust archive.
- 30 GRO D637 II 7 B1.
- 31 Information in the archives at the National Museum of Wales, communicated by David Bick.
- 32 Hart C E, 1971, The Industrial History of Dean pp 131-2.
- 33 Nicholls, 1958: see (6) supra.
- 34 Hart C E, 1971, see (32) supra.

- 35 Tithe Award Map of the Parish of Newland, 1840. GRO.  
 36 Original deed with the Whitecliff Furnace Trust archive.  
 37 Information from the historical files of Dr C E Hart, now  
 in the W F T archive.  
 38 Ibid.  
 39 Ibid.  
 40 Original document in the W F T archive. The map erroneously  
 identifies part of the hillside south of the furnace instead  
 of the furnace itself.  
 41 Letters in the W F T archive.  
 42 GRO Q/RUM 34.  
 43 Plan of a proposed railway through Dean Forest, Monmouth,  
 Usk and Pontypool. 1852. GRO in Q/RUM series.
- .....

## APPENDIX I

### New information concerning the Ironworks, personnel & associated matters, for the period 1798-1810.

Since the original publication by the present author of Parts I & II in 1980 and 1981, some additional material has come to light.

### Contemporary illustration of the Ironworks.

Dr. C Hart has drawn my attention to a sketched road map of Whitecliff and Highmeadow among a bundle of papers in the Gage Collection at GRO, dating between 1800 and 1910. (D 1677 GG 1545) It may have been drawn by James Davis, steward to Lord Gage, and is a two-dimensional sketch. Beside the lane at Whitecliff is drawn the front elevation of a furnace. It depicts the fore arch and two rather unlikely-looking windows at high level. Smoke issues from the top. It is labelled 'Furnace' and this being emphatically singular suggests a date of around 1800.

### Samuel Botham's house at Whitecliff.

During the research undertaken by Dr. C Hart for his book Coleford, both he and the present author came across different old photographs of a large house and farm in Whitecliff south of the Ironworks. It was demolished in the early part of this century and stood at NGR SO 568101. This is the house where Samuel Botham and his family lived in 1798-99, and the birthplace of his daughter, Mary, who later became the poetess. In 1811 Thomas Nicholson was the occupier and had possibly been there for some years. One picture is reproduced in Coleford p 362 with an account on p 363.

### Descendants of Samuel Botham.

In 1983 an enquiry was made to the Coleford Town Clerk by Mr A Baker of Ruthin, who was tracing his family tree. His letter was stimulated by a family rumour that his 'grandfather' Botham had an ironworks near the town. The present writer was able to correct this rumour and to show that this 'grandfather' was James Botham, brother of Mary and son of Samuel, and also to supply several more generations of the tree. Mr Baker kindly sent a photograph portrait of James Botham taken when the latter was aged 98 years.



James Teague's brother at the Neath Abbey Ironworks.

A letter from Thomas Halford to David Mushet (GRO D 2646) refers to this matter without identifying the name or position he held. Mr L Ince, author of The Neath Abbey Iron Company, 1984, has kindly investigated the matter and has found references to Thomas Teague amongst the Gwyn Manuscripts for 1807 and 1814. Thomas Teague appears to have been the mine manager for the company and died c. 1814. The details are in the W F T archive.

The date of building Mr Teague's Railway.

In Part I it was shown that the original partners at the Whitecliff Ironworks were the same partners who devised and built Mr Teague's Railway. This was the first Tramroad in Dean and possibly also in the County. It was a small private line running from near Mile End to White Oak and eventually to Lydbrook. In common with the earlier research by H W Paar, the present author dated the tramroad from 1801. However, Fisher 1981\* and Anstis 1968\*\*, both working from PRO documents, have suggested a building date around 1795-96.

A previously unnoticed letter in the Gage Collection at GRO (D 1677 GG 1545/62) contains further useful information. It is dated 4 May 1801, addressed to Lord Gage, and written by James Davis his steward. The punctuation is sparse and the relevant section is as follows:

"... I suppose you will receive a letter from Dr Mathews or some of the Hereford Gentlemen concern'd in the coal trade to request you will grant Mr Bishton, Phillips & Teague leave to bring the railroad through your Lordships land as you had allowed them to do, they only wish a rail to be made that they may have coals at a cheaper rate, there is another party in Hereford who wish to speculate in railroads and get a profit paid by the tolls paid to the makers who wish the private road to be destroy'd that there may be no opposition I am no great judge of these things but it seems to me really an advantage to the publick to have two roads, and I think as Mr Bishton brought the plan into the country it would be hard to have his road come to nothing and other people take the benefits of his plan, if you do not hear from the Hereford Gentlemen I hope you will write me your sentiments upon it, as I heard them wish him to go on with it, and if he did not they would do it themselves, if you do come into the country I don't think you could be very comfortable at Newland as Mr Probyn cannot bear to hear a syllable upon any dispute about getting clay neither could he bear to hear the railroads mention'd ..."

It is clear from this letter that Teague's Railway had not yet physically passed through the lands of Lord Gage - an earlier arrangement had been made for it to do so. These lands were part private freeholds and part forest, being in Lord Gage's bailiwick of Bicknor. Map evidence discussed by Clissold and Standing 1980\*\*\*, indicated that the tramroad had been built by 1801 from Teague's Engine Pit as far as White Oak, but no further. Davis's letter supports this view. It is possible that the date 1795-96 suggested by Fisher and Anstis is correct for this section of the tramroad. The remaining portion from White Oak to Lydbrook was built after 4 May 1801. It first appears on maps in 1803.

APPENDIX II.Recent archaeological discoveries at Whitecliff in relation to the published history.

During the period October 1985 to October 1986 an exploratory archaeological excavation was initiated by Dean Heritage Museum Trust and the Whitecliff Furnace Trust, joint owners of the site. Using a team funded by the Manpower Services Commission and administered by the Crickley Hill Archaeological Trust, an area lying to the south of the extant furnace was investigated. Initially this was directed by Jude Callister, archaeologist with DHMT, but following her departure the majority of the excavation was directed by Mike Sims from Crickley Hill Archaeological Trust.

The area investigated measured 20 x 5 metres and ran south from the extant furnace parallel to the cliff. A complex stratigraphy overlay the foundations of a second blast furnace which stood immediately to the south of the extant furnace. Further south still were foundations of other buildings and structures including a possible haystack boiler base. The newly-found blast furnace appears to have been built before the extant furnace and it seems probable that these are the two furnaces shown on the maps of 1808 and 1809. The newly-found furnace is probably the one featured in the illustration dated c.1800 (see Appendix I) and a map of 1801 (GRO Q/RUM 5). The charging bridge abutment which lies between the extant furnace and Furnace Cottage was clearly intended for a third furnace. Future excavation will be needed to determine whether or not this was built.

A report of the excavation will be published by Mike Sims in due course. Both Dean Heritage Museum Trust and the Whitecliff Furnace Trust wish to place on record their appreciation of the work carried out by the directors and excavators and also for the able administration of the Crickley Hill Archaeological Trust.

A second phase of excavations, which will last one year, was started in November 1986. This is examining a much larger area to the roadside of the area first excavated. Members of the Society are most welcome to visit.

References.

- \* Fisher C, Custom, Work & Market Capitalism. Crook Helm, London, 1981, pp22-3.
- \*\* Anstis R, Warren James and the Dean Forest Riots. Albion House, Coleford, 1986, pp 58-60.
- \*\*\* Clissold G C and Standing I J, Mr Teague's Railway: Some new Information. GSIA Journal for 1980, pp 48-57.



KEY to MAP 3 Owners & Occupiers etc. in 1852.

No.	Description	Owner	Lessee	Occupiers
103	garden	Thomas Meyrick	-	James Taylor
104	garden	same	-	William Evans
105	old ruin	same	-	vacant
106	warehouse	same	-	Thomas Wyatt
107	Hse & gdn	same	-	James Taylor
108	Hse & gdn	same	-	William Evans
109	3 limekilns, quarries, cabin & brake	Peter Teague & Thomas Birt Trotter		on hand
110	Farm hse, yard & bldgs	Rev John Noble Shipton	-	Thomas Rosser
111	gdn	same	-	same
112	gdn	same	-	same
113	arable	same	-	same
114	pasture, footpath & brake	Surveyor of highways	-	same
115	orcharding & brook	John Noble Shipton		
116	occupation rd	Peter Teague & T. Birt Trotter	-	in hand

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CHALFORD TO WESTMINSTER.



The great-great-uncle of the Editor, Obadiah Cox, was born in Eastcombe but moved to King's Court in Rodborough Parish, where he married the daughter of one James Barter. His father, Escott Cox, was a stone mason. Obadiah, according to family tradition, worked as a mason on the rebuilding of the Houses of Parliament after the great fire of 1835; but he brought his children back from Horseferry Road to be entered on the baptismal roll of Rodborough Tabernacle.

Tradition would appear to be true. Chalford Church Guide notes that the mason-foreman, on the rebuilding of the Palace of Westminster, John Thomas, came from Chalford. It seems clear that he gave opportunities (and employment) to masons from his own area, and probably these came from families known to him.

CC

Sources:

Marriage and baptismal records of Rodborough Tabernacle.  
Rodborough Parish Church Banns of Marriage.  
Chalford Church Guide and VCH xi p 30.